

# Madicken Munk

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3115B Etcheverry Hall, University of California, Berkeley

## Education

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### University of California, Berkeley

Berkeley, California

*PhD Graduate Student, Nuclear Engineering*

Attended August 2011 – Present

*Master of Science, Nuclear Engineering*

Completed December 2013

### Oregon State University

Corvallis, Oregon

*Bachelor of Science, Nuclear Engineering*

Attended September 2007 – June 2011

## Skills and Experience

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### Codes and Code Packages

SERPENT

Python

COMSOL Multiphysics

MCNP5, MCNP6

MATLAB

Computer Aided Design Using SolidWorks

### Topical Experience

Reactor Physics

Software Development

Flibe-based reactor systems

Advanced Reactor Concepts

Neutron Transport

Reactor Core Design

Pebble Bed Reactors

Isotope Geochemistry

## Employment

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University of California, Berkeley Nuclear Engineering Department August 2011 to Present

- Design of a neutron source for in-situ irradiation of geological samples for  $^{40}\text{Ar}/^{39}\text{Ar}$  geochronology of martian samples. This is in collaboration with the Scottish Universities Environmental Research Centre (SUERC).
- MS work involved evaluating the lifetime of a central reflector in a FHR core based on the evaluation of radiation-induced stresses. This involved connecting literature data, MCNP data, and COMSOL modules to determine the lifetime of the reflector.
- Designed a fluoride salt-cooled high temperature test reactor (FHTR) in parallel with the development of a commercial FHR design. This included optimization of core and fuel design while maintaining similitude between the FHTR and FHR, insurance of negative temperature feedback mechanisms, and achievable burnup of the fuel.
- As a Graduate Student Instructor, work included grading assignments, holding review sessions, and a weekly hour-long discussion section to review course material. GSI assignment covered Nuclear Reactions and Radiation, Introduction to Nuclear Reactor Theory, and Numerical Methods in Nuclear Engineering.

Oregon State University Radiation Center

June 2008 to August 2011

- From 2008 to 2011, design and simulation of Molybdenum-99 production target in the Oregon State TRIGA reactor were performed using MCNP5. Verification of reactivity worth and power distribution of the various design modifications also included in project.
- 2010-2011 analyses included MCNP5 verification of Reed College reactor for their updated Safety Analysis Report and license renewal. Included comprehensive review of reactor physics and neutronic calculations pertinent to safety analysis.
- In a joint study between *Lawrence Livermore National Laboratories* and Oregon State University during Summer 2008, group research projects focused on interpersonal skills and dynamics involving teams of engineers and scientists.

## Scholarships and Awards

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- ANS Best Graduate Paper Award, Student Conference Spring 2014
- Outstanding Graduate Student Instructor Award 2013-2014
- UC Regents Fellowship, UC Berkeley 2014
- NRC Fellowship, UC Berkeley 2011-2012
- DOE NEUP Scholarship Awardee 2010-2011
- Karena Dokken Memorial Scholarship Recipient Spring 2010
- Awarded NRC Scholarship by OSU department of NE/RHP Fall 2009
- Awarded National Academy for Nuclear Training Scholarship Summer 2009
- Grund Memorial Scholarship Awardee Fall 2009
- DOE NEUP Scholarship Awardee 2009-2010
- Intel Scholar Summer 2008

## Publications, Presentations and Patents

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- “Instrumentation Development for planetary in-situ  $^{40}\text{Ar}/^{39}\text{Ar}$  Geochronology”, Munk, M., Morgan, L., Davidheiser-Kroll, B., et al., poster presentation, American Nuclear Society Winter Meeting, November 2014
- “Instrumentation Development for planetary in-situ  $^{40}\text{Ar}/^{39}\text{Ar}$  Geochronology”, Morgan, L., Davidheiser-Kroll, B., Munk M., et al., poster presentation, Goldschmidt Conference June 2014
- “Use of Comsol Multiphysics for the Evaluation Of Radiation-Induced Stresses in the PB-FHR”, Munk, M., paper presentation, ANS student conference, April 2014
- A. Cisneros et al., "Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Methods and Experiments Program White Paper." UCBTH-12-002, Department of Nuclear Engineering, UC Berkeley (2013).
- G. Cao et al., "Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Matierals, Fuels and Components White Paper." UCBTH-12-003, Department of Nuclear Engineering, UC Berkeley (2013).
- D. Carpenter et al., "Fluoride-Salt-Cooled, High-Temperature Reactor (FHR) Development Roadmap and Test Reactor Performance Requirements White Paper." UCBTH-12-004, Department of Nuclear Engineering, UC Berkeley (2013).
- “Preliminary Design of a FHR Test Reactor Core”, Munk, M., Cisneros, A. T., Greenspan, E., Peterson, P.F., paper presentation, ANS national conference, June 2012.
- “Molybdenum Production in a Low-Power Reactor”, Palmer, T.S., Reese, S., Keller, S.T., Munk, M., application submitted July 2010, **Patent Pending**
- *Optimization of Molybdenum-99 Production in Oregon State TRIGA Reactor*, Madicken Munk, conference presentation, ANS national student conference 2010.
- *Production of Medical Isotope in Oregon State University TRIGA Reactor*, Madicken Munk, poster presentation. 1<sup>st</sup> International Nuclear Energy Conference, Warsaw, Poland, April 2011.

## Activities

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- Vice President of University of California, Berkeley Chapter of Alpha Nu Sigma, 2013-Present
- Attended Frédéric Joliot and Otto Hahn Summer School, August 2012, on Small Modular Reactors
- President of Oregon State University student American Nuclear Society chapter, 2011-2012
- Secretary of Oregon State University student American Nuclear Society chapter, 2009-2011
- Member of Alpha Nu Sigma, Nuclear Engineering Honors Society, inducted May 2011
- President of Mentors and Mentees, an undergraduate peer-mentoring program.
- College of Engineering Ambassador
- Participated in numerous departmental and university-sponsored outreach events